

Tusayan Flood Reduction Project PROPOSED ACTION OCTOBER 24, 2012

PROJECT BACKGROUND

The Town of Tusayan, Arizona, located in the Colorado River Basin in Northern Arizona (Figure 1), is surrounded by the Tusayan Ranger District of the Kaibab National Forest, on the east, west, and south, and by Grand Canyon National Park to the north. State Route 64 (SR 64) bisects the town and provides access to Grand Canyon National Park. The town is located at the confluence of three drainages that enter the town on the east side of SR 64, and has experienced several flooding events during the past 10 years. Flooding occurs approximately every 2 to 3 years, with the most recent flood event occurring in 2005. Floodwaters enter the town from the east and flow through the town, exiting into Coconino Wash on the western side of SR 64. This flooding negatively affects the Town of Tusayan and downstream water resources on the Kaibab National Forest in several ways, including:

- loss of safe access to and potentially damaging the town and forest road system, impacting school bus routes, businesses, residential areas, and community properties;
- dangerous conditions and interrupted service associated with the utility infrastructure, including electric transmission, propane, water, and communications;
- property damage;
- impaired operation of the South Grand Canyon Sanitary District (SGCSD) with the potential for discharge of untreated effluent into Coconino Wash;
- increased sediment loads and erosion downstream in the lower Coconino Wash area with destruction of riparian vegetation and potential erosion of forest roads, and
- decreased water quality downstream on the Kaibab National Forest. Floodwater may contain oil, grease, pesticides, fertilizers, and fecal matter from domestic animals.

The SGCSD water treatment plant is located on the west side of the Town of Tusayan and SR 64 along the area of Coconino Wash that receives floodwaters. The SGCSD has suggested an idea of constructing multiple detention basins in the drainage areas upstream of the Town of Tusayan on the Kaibab National Forest to reduce the volume and velocity of floodwater passing through the town, and therefore reduce the impacts described above.

The SGCSD recently commissioned a drainage study on the eastern side of the Town of Tusayan, titled *Phase I Drainage Study, Tusayan, Arizona, East of Highway 64*¹. The study was conducted on the Coconino Wash Headwaters 6th-level (HUC12) subwatershed and two of its subwatersheds that the study calls the Northeast Watershed and the Southeast Watershed (see Figure 2). The study describes the watershed qualities, floodwater runoff potential, and recommendations to reduce flooding in the Town of Tusayan.

The study also presents hydrologic modeling of the watershed that estimates the quantity of floodwater that could occur at the outlets (the downstream points of the watersheds where the water exits into the Town of Tusayan) during a range of rainfall event intensities. The report states that historically Coconino

¹ Peak Engineering, Inc. 2012. Phase I Drainage Study, Tusayan, Arizona, East of Highway 64. Flagstaff, Arizona.

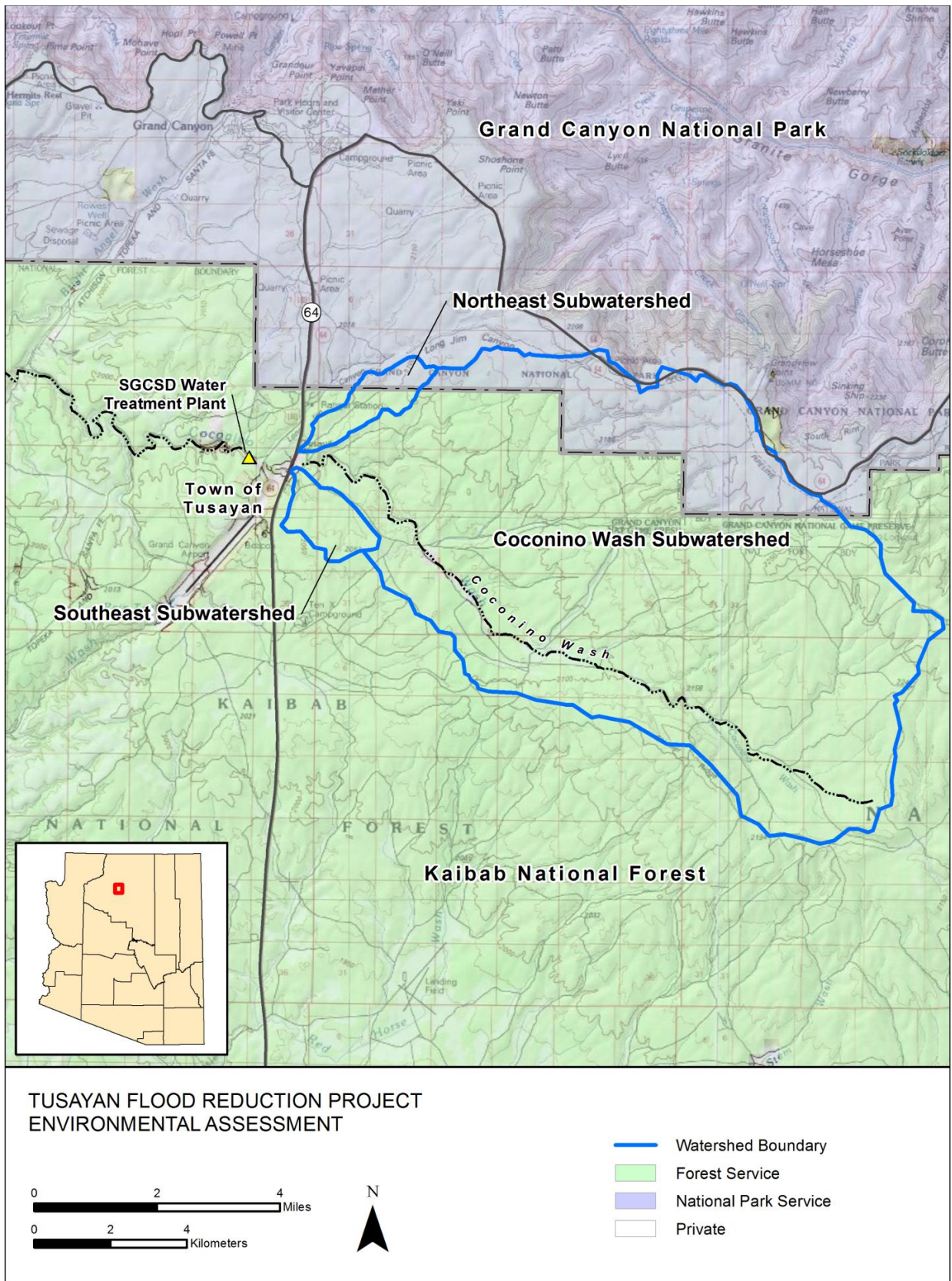


Figure 1. Project vicinity.

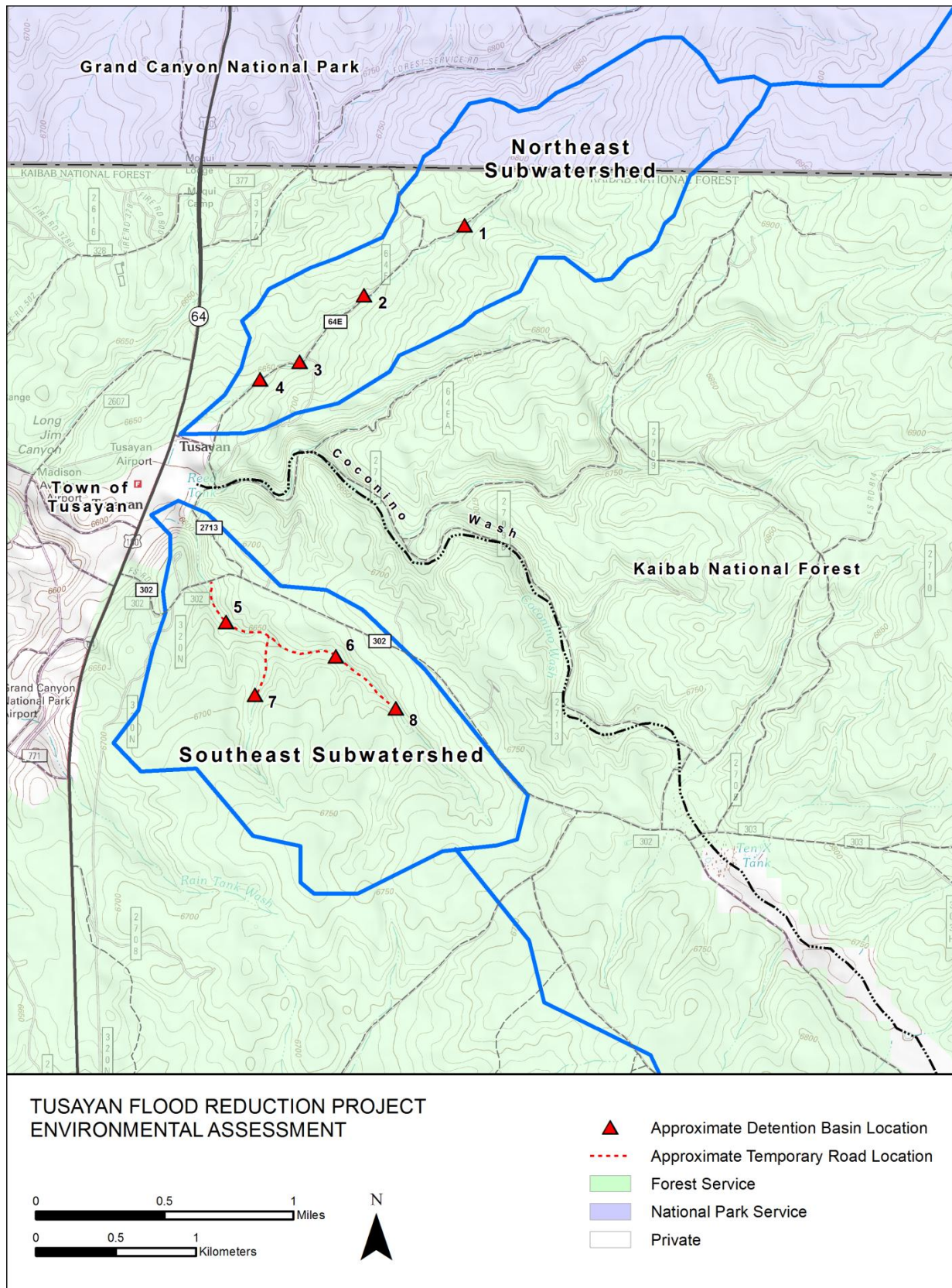


Figure 2. Approximate proposed detention basin locations.

Wash does not produce flow at the outlet; this may be because the drainage has a high infiltration potential and already contains several tanks that detain water. Due to the lack of flow exiting the Coconino Wash Subwatershed, the study focused on the Northeast and Southeast Subwatersheds as potential locations for detention basins to mitigate floods in the Town of Tusayan.

PURPOSE AND NEED

The primary purpose of the proposed project is to reduce the amount of floodwaters entering the Town of Tusayan, the downstream SGCS D water treatment plant, and the Coconino Wash on the Tusayan Ranger District. The primary purpose of the proposed detention basins is to reduce the flood peaks (high water at the watershed outlet) and velocity (speed of water flow at outlet). The same quantity of water would flow out of the watershed outlet, but water flow timing would be extended, lower, and slower.

PROPOSED ACTION

The Tusayan Ranger District proposes to construct eight detention basins on the eastern side of the Town of Tusayan to meet the Purpose and Need. The proposed detention basins would be located in the Northeast and Southeast Subwatersheds. Figure 2 illustrates the watershed boundaries and the approximate locations for four proposed detention basins in each watershed. The basins are located in Township 30 North, Ranges 2 and 3 East Sections 13, 18, 19, 24, 25, and 30, Coconino County, Arizona.

Design

The proposed detention basins would be designed to detain approximately 10 acre-feet of water within each watershed, for a total detention of 20 acre-feet of water for the entire project. This 20 acre-feet of water would be held by these eight basins of varying size (four basins in each watershed). Varying the size and shape allows for design flexibility and environmental protection based on the landscape features and environmental resources in each basin area. The basins would be similar to the typical “tank” water detention features located in the Coconino Wash Subwatershed and elsewhere on the Kaibab National Forest.

In general, the basins would contain approximately 2.5 acre-feet of water each. A typical basin that detains 2.5 acre-feet of water would average approximately 4 feet deep by 160 feet wide by 160 feet long. Design features include a 4-foot aboveground spillway “lip” on the downstream side, a maximum depth of 6 feet belowground, and sloping sides that allow for revegetation. The disturbance footprint for each basin would be approximately 1 acre.

The goal of the proposed project is to detain approximately 10 acre-feet of water in each watershed. This could be accomplished by constructing eight smaller basins as presented in this proposal or by constructing fewer larger basins in the same locations. The Tusayan Ranger District will look at all issues *presented during scoping to determine what other alternatives might be developed.*

The Phase I Drainage Study, Tusayan, Arizona, East of Highway 64 calculated the potential reduction of flows at the watershed outlets that could result from detention basin construction. Table 1 presents the potential percentage of reduced floodwater flow for different storm intervals. Storm intervals are presented in years and represent the probability and size of a given rainfall event. For example, a 2-year storm event has a probability of occurring once every 2 years or a 50% chance of occurring in any given year. A 10-year event has a probability of occurring once every 10 years or a 10% chance of occurring in any given year. Higher storm intervals represent larger rainfall events.

Table 1. Percent Reduction in Flows at Watershed Outlet for Multiple Storm Return Intervals

Storm Return Interval (years)	Northeast Subwatershed	Southeast Subwatershed
1	36%	52%
2	37%	47%
5	28%	32%
10	29%	45%
25	47%	58%
100	N/A	N/A

The *Phase I Drainage Study, Tusayan, Arizona, East of Highway 64* included some issues related to model estimates and detention basin recommendations:

- There is a potential for overestimation of the total runoff from the watersheds, because the anecdotal observed output of Coconino Wash does not match the model's prediction. This could be because the watershed absorbs larger amounts of water than the model predicted.
- Observations during a storm event illustrated that some flooding in the Town of Tusayan is the result of little or no storm water infrastructure within the town. Flows appeared to emanate from the developed areas in town and the impervious surfaces within town are contributing to nuisance flooding.

Because of these issues, the basins' effectiveness is expected to be greatest for less-frequent storm events (e.g., 5-year events and higher). This is because the flooding that occurs during more frequent events (1- and 2-year storm events) is more likely to be the result of water generated within the town and lack of storm water infrastructure.

Access for construction and maintenance of the detention basins would be by existing forest system roads to the maximum extent possible. Forest Road 64E provides access to the Northeast Subwatershed for construction of basins 1, 2, 3, and 4, and Forest Road 302 provides access to the Southeast Subwatershed for construction of basins 5, 6, 7, and 8. Road access to the Southeast Subwatershed basin locations is more limited and some temporary road construction and overland travel with heavy equipment would be necessary. Surplus material removed during construction of the basins would be removed from the site as necessary; the basins would be covered with topsoil and revegetated.

Construction practices would include any best management practices (BMP's) deemed necessary by the USDA Forest Service to reduce environmental impacts during and post-construction. This includes erosion controls to protect water quality, topsoil stockpiling for revegetation, seeding all disturbed areas with a recommended native plant seed mix, mulching seeded areas, and mitigating invasive weed introduction.

Monitoring and Maintenance

The detention basins would be designed to remain stable and require minimal maintenance. The basins would be periodically monitored for erosion, sedimentation, revegetation success, and noxious weeds. Whenever possible, monitoring and maintenance would be conducted by foot travel on all detention basins not directly adjacent to road access.

Relationship of the project to the Land and Resource Management Plan

The proposed project area is covered by two Geographic Areas (GA); GA 8 - Southern Tusayan Woodland and GA 10 -Tusayan Forestland, by one Use Zone; 21 – Existing Developed Recreation Sites, and by one 6th-level (HUC12) subwatershed Coconino Wash Headwaters. Geographic area direction specific to Soil and Water resources includes:

- Intensive management of soil and watershed resources. Make soil and watershed resource inventories and analyses to ensure the conservation of soil and water resources and to avoid significant and permanent impairment of site productivity.
- Provide Use Zone 21 – Existing Developed Recreation Sites soil and water resource integration and coordination in land and resource management planning. Changes in site productivity generally result from the interaction of other resource practices or catastrophic agents with the hydrologic condition present in the watershed.
- Formulate and execute land treatment measures to (1) close, revegetate and thereby obliterate, system roads not needed for resource actions and (2) establish groundcover improvements in degraded, unsatisfactory watersheds to return them to satisfactory condition.
- Provide for the long-term maintenance of vegetative ground-cover improvements. Maintain soil and water inventory and information systems.

Environmental Resources

Consultation with the U.S. Fish and Wildlife Service would occur for any threatened, endangered, or sensitive species found in the project area. In particular, the California condor (federally listed as threatened) and its habitat are found in the project area and would be included in this analysis. Any mitigation features for threatened, endangered or sensitive species would be incorporated into the analysis.

The proposed basin locations were chosen to minimize environmental impacts. This area of the Kaibab National Forest contains a high density of cultural resources and archaeological sites. Generally, the area's cultural resources have been studied and surveyed for past projects. This survey information was used to determine the proposed basin locations. Additional cultural resources surveys would be conducted, if necessary.

DECISION FRAMEWORK AND RESPONSIBLE OFFICIAL

The Tusayan Ranger District expects to conduct an environmental assessment for this proposed action. The Tusayan District Ranger is the responsible official who will review the proposed action, any alternatives that are developed, and the environmental consequences to make a decision. Based on the purpose and need for action, the findings of the environmental assessment, consistency with The Kaibab National Forest Land Management Plan, and the best available science, the District Ranger will decide whether to:

- select and implement the proposed action as described or an alternative to this proposal developed to address other resource conflicts;
- choose not to take action at this time; or

- develop an environmental impact statement.

This is the first step in the scoping process under the National Environmental Policy Act (NEPA), which requires federal agencies, such as the USDA Forest Service, to consider the potential physical, biological, social, and economic effects of their actions on the environment. The Tusayan Ranger District will be conducting an environmental analysis and preparing an environmental assessment on the proposed action described above.

PUBLIC INVOLVEMENT

If you have information you believe the Kaibab National Forest may not have, or have input regarding this proposed action, please send that information to Nicholas Larson, District Ranger, Tusayan Ranger District, PO Box 3088, Grand Canyon, Arizona 86023, telephone (928) 638-2443, fax (928) 638-1065, or email him at nicholaslarson@fs.fed.us.

Comments may also be hand delivered to the Tusayan District Office at 176 Lincoln Log Loop, Tusayan, Arizona between 8:00 a.m. and 4:30 p.m., Monday through Friday, except holidays. Comments received in response to this solicitation, including names and addresses of those who comment, will be considered part of the public record on this project and will be available for public inspection. To be the most helpful in the planning process, please provide your comments by **November 26, 2012**.

We appreciate your involvement and comments on this proposed action. Should you have any questions, or need additional information, please contact Nicholas Larson, the Tusayan District Ranger, at the contact information provided above.